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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,539	05/25/2001	Armando J. Vigil	64601	4241
27975	7590	02/08/2005	EXAMINER	
ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST P.A. 1401 CITRUS CENTER 255 SOUTH ORANGE AVENUE P.O. BOX 3791 ORLANDO, FL 32802-3791			WARE, CICELY Q	
			ART UNIT	PAPER NUMBER
			2634	

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/866,539

Applicant(s)

VIGIL, ARMANDO J.

Examiner

Cicely Ware

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-59 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-33 and 48-59 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-14, 19-21, 34-37 and 39-47 is/are rejected.
- 7) ☒ Claim(s) 5, 15-18 and 38 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

### ***Specification***

2. The disclosure is objected to because of the following informalities:

a. Examiner suggests applicant use a consistent line spacing throughout the entire disclosure for clarification purposes.

b. Pg. 4, line 20, applicant uses the phrase "typically not at issue". Examiner suggests using "typically not an issue" for clarification purposes.

c. Pg. 11, line 29, applicant uses the phrase "of the prior will be". Examiner suggests using "of the prior art will be" for clarification purposes.

Appropriate correction is required.

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 6-14, 19-21, 34-37, 39-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al. (US Patent 6,044,111) in view of Ross (US Patent 5,692,006)

(1) With regard to claim 1, Meyer et al. discloses a method for demodulating a received digitally modulated signal subjected to multipath propagation impairment, the method comprising: estimating the multipath propagation impairment of the received digitally modulated signal; estimating at least one symbol of the received digitally modulated signal; and adjusting the at least one estimated symbol based upon the estimated multipath propagation impairment to generate an estimate of the at least one symbol as impaired by the multipath propagation (col. 1, lines 8-54).

However Meyer et al. does not disclose generating at least one error signal by comparing the estimate of the at least one symbol as impaired by the multipath propagation to the received digitally modulated signal; and using the at least one error signal for estimating remaining symbols to be demodulated.

However Ross discloses in (Fig. 1) generating at least one error signal (128) by comparing the estimate of the at least one symbol as impaired by the multipath propagation to the received digitally modulated signal; and using the at least one error

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signal for estimating remaining symbols to be demodulated (134, 103) (col. 1, lines 22-34, col. 2, lines 9-11, 17-23, col. 3, lines 28-41, 51-55, col. 4, line 38, col. 5, lines 3-11, 29-57).

Therefore it would have been obvious to one of ordinary skill in the art to modify Meyer et al. in view of Ross to incorporate generating at least one error signal by comparing the estimate of the at least one symbol as impaired by the multipath propagation to the received digitally modulated signal; and using the at least one error signal for estimating remaining symbols to be demodulated in order to generate an unmodulated pilot estimate (Ross, col. 5, lines 44-46)

(2) With regard to claim 2, claim 2 inherits all the limitations of claim 1. Ross further discloses using the at least one error signal for refining the estimated multipath propagation impairment in order to keep the gain from slow convergence (col. 6, lines 60-64).

(3) With regard to claim 3, claim 3 inherits all the limitations of claim 2. Ross further discloses estimating at least one next symbol; and adjusting the estimate of the at least one next symbol based upon the refined estimated multipath propagation impairment for generating an estimate of the at least one next symbol as impaired by the multipath propagation (col. 8, lines 27-45).

(4) With regard to claim 4, claim 4 inherits all the limitations of claim 3. Ross further discloses refining the at least one error signal by comparing the estimate of the at least one next symbol as impaired by the multipath propagation to the received digitally modulated signal (col. 8, lines 27-45).

(5) With regard to claim 6, claim 6 inherits all the limitations of claim 1. Ross further discloses estimating the multipath propagation impairment is based upon an adaptive algorithm (col. 3, lines 27-45).

(6) With regard to claim 7, claim 7 inherits all the limitations of claim 6. Ross further discloses the adaptive algorithm comprises a least mean square (LMS) algorithm because it needs no repetition of the data (col. 3, lines 27-45, col. 4, line 14).

(7) With regard to claim 8, claim 8 inherits all the limitations of claim 7. Ross further discloses applying a convergence coefficient to the LMS algorithm, with the convergence coefficient being based upon the received digitally modulated signal so that the gain is appropriately chosen, slow convergence if it is too small and causes instability if it is too large (col. 3, lines 27-45, col. 6, lines 60-64).

(8) With regard to claim 9, claim 9 inherits all the limitations of claim 1. Ross further discloses estimating the at least one symbol is based upon an adaptive algorithm (col. 4, lines 14-15, col. 5, lines 3-11).

(9) With regard to claim 10, claim 10 inherits all the limitations of claim 9. Ross further discloses the adaptive algorithm comprises a least mean square (LMS) algorithm (col. 3, lines 27-45, col. 4, line 14).

(10) With regard to claim 11, claim 11 inherits all the limitations of claim 10. Ross further discloses comprising applying a convergence coefficient to the LMS algorithm, with the convergence coefficient being based upon the digital signal (col. 3, lines 27-45).

(11) With regard to claim 12, claim 12 inherits all the limitations of claim 1. Meyer

et al. further discloses estimating the multipath propagation impairment is based upon a training waveform embedded in the received digitally modulated signal in order to provide the most probable transmit sequence determined from all possible data sequences (abstract, col. 1, lines 22-25, col. 4, lines 59-62).

(12) With regard to claim 13, claim 13 inherits all the limitations of claim 1. Meyer et al. further discloses estimating the at least one symbol is based upon a training waveform embedded in the received digitally modulated signal in order to determine the most probable transmit sequence from all possible data sequences (abstract, col. 1, lines 8-25, col. 4, lines 59-62).

(13) With regard to claim 14, claim 14 inherits all the limitations of claim 1. Meyer et al. further discloses estimating the remaining symbols to be demodulated is based upon linear estimation in order to adapt the receiver to the respective time-variant transmission properties of the transmission channel (col. 1, lines 36-60, col. 2, lines 10-14).

(14) With regard to claim 19, claim 19 inherits all the limitations of claim 1. Meyer et al. further discloses in estimating the at least one symbol is based upon maximum likelihood sequence estimation (MLSE) (col. 1, lines 47-59, col. 2, lines 1-3, col. 5, lines 4-7).

(15) With regard to claim 20, claim 20 inherits all the limitations of claim 1. Ross further discloses wherein the received digitally modulated signal comprises at least one of a digital broadcast television signal, a digital broadcast radio signal, a digital cellular telephone signal, and a digital wireless local area network (LAN) signal in order for the

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same frequency band to be used for communication in all cells (col. 2, lines 1-2, col. 3, line 46).

(16) With regard to claim 21, claim 21 inherits all the limitations of claim 1.

Meyer et al. further discloses in (Fig. 3) the received digitally modulated signal comprises a digitally serial modulated signal (col. 1, lines 22-25, col. 6, lines 20-37, 48-63).

(17) With regard to claim 34, claim 34 inherits all the limitations of claim 1.

(18) With regard to claim 35, claim 35 inherits all the limitations of claims 34 and 2.

(19) With regard to claim 36, claim 36 inherits all the limitations of claims 35 and 3.

(20) With regard to claim 37, claim 37 inherits all the limitations of claims 36 and 4.

(21) With regard to claim 39, claim 39 inherits all the limitations of claims 34 and 6.

(22) With regard to claim 40, claim 40 inherits all the limitations of claims 39 and 7.

(23) With regard to claim 41, claim 41 inherits all the limitations of claims 34 and 9.

(24) With regard to claim 42, claim 42 inherits all the limitations of claims 41 and 10.



(25) With regard to claim 43, claim 43 inherits all the limitations of claims 34 and 12.

(26) With regard to claim 44, claim 44 inherits all the limitations of claims 34 and 13.

(27) With regard to claim 45, claim 45 inherits all the limitations of claims 34 and 14.

(28) With regard to claim 46, claim 46 inherits all the limitations of claims 34 and 46.

(29) With regard to claim 47, claim 47 inherits all the limitations of claims 34 and 21.

***Allowable Subject Matter***

6. Claims 5, 15-18, 38 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: The instant application discloses a method for demodulating a received digitally modulated signal subjected to multipath propagation impairment. Prior art references show similar methods but fail to teach: **“refining the at least one error signal further comprises comparing the estimate of the at least one next symbol as impaired by the multipath propagation to the at least one error signal resulting from at least one previous comparison”**, as in claims 5 and

38; **“estimating the multipath propagation impairment is performed during at least one interval of clear-channel reception”**, as in claim 15; **“estimating the multipath propagation impairment is performed during at least one interval of benign multipath propagation impairment”**, as in claim 16; **“estimating the at least one symbol is performed during at least one interval of clear-channel reception”**, as in claim 17; **“estimating the at least one symbol is performed during at least one interval of benign multipath propagation impairment”**, as in claim 18.

7. Claims 22-33,48-59 are allowed.

8. The following is a statement of reasons for the indication of allowable subject matter: The instant application discloses a method for demodulating a received digitally modulated signal subjected to multipath propagation impairment. Prior art references show similar methods but fail to teach: **“generating at least one error signal by comparing a summation of the estimates of the at least one symbols as impaired by the corresponding multipath propagation to the plurality of received digitally modulated signals”**, as in claim 22; **“a plurality of channel estimators, a plurality of symbol estimators”**, as in claim 48.

### ***Conclusion***

9. The prior art made record of and not relied upon is considered pertinent to applicant's disclosure:

a. Dent et al. US Patent 5,335,250 discloses a method and apparatus for bidirectional demodulation of digitally modulated signals.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 571-272-3047. The examiner can normally be reached on Monday – Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

*Cicely Ware*

cqw  
February 3, 2005

*Amandale*  
AMANDA L  
PRINCIPAL EXAMINER